

Renewable Energy and Corporate Markets

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World Resources Institute

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GREEN POWER MARKET DEVELOPMENT GROUP

Agenda

- Introduction to renewable energy and the GPMDG
- Business case for green power
- New markets



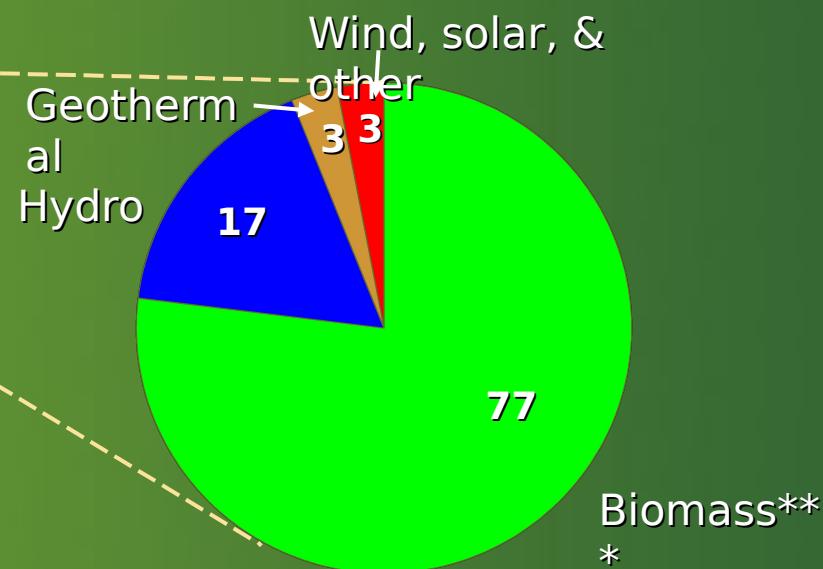
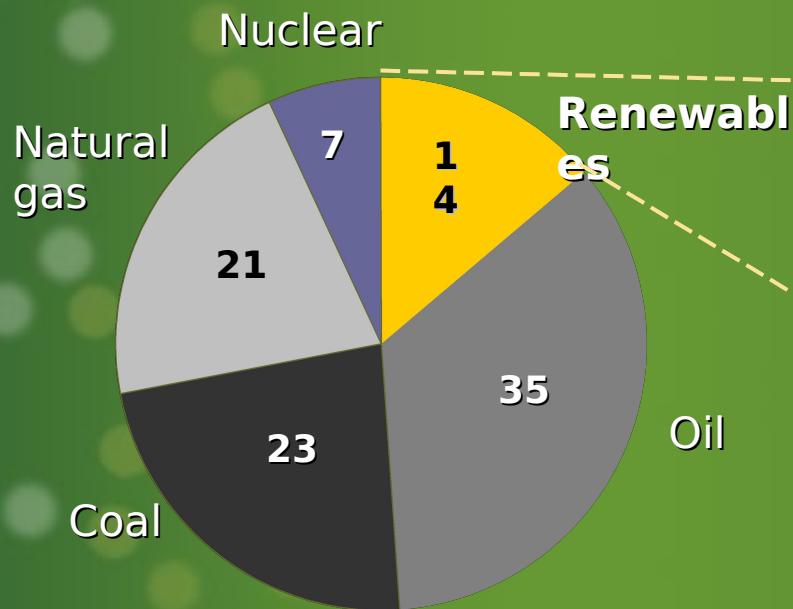
Worldwide primary energy supply - 2000

World primary energy* supply,
2000

Percent, 100% = 9,958 Mtoe**

Breakdown by renewable resource, 2000

Percent, 100% = 1,374 Mtoe**



* Primary energy = Reflects fuels used directly (e.g., for heat) and indirectly (e.g., to generate electricity)

** Mtoe = Million metric tons of oil equivalent

*** Includes wood, wood & crop residues, animal wastes, landfill gas, and other energy sources from organic materials

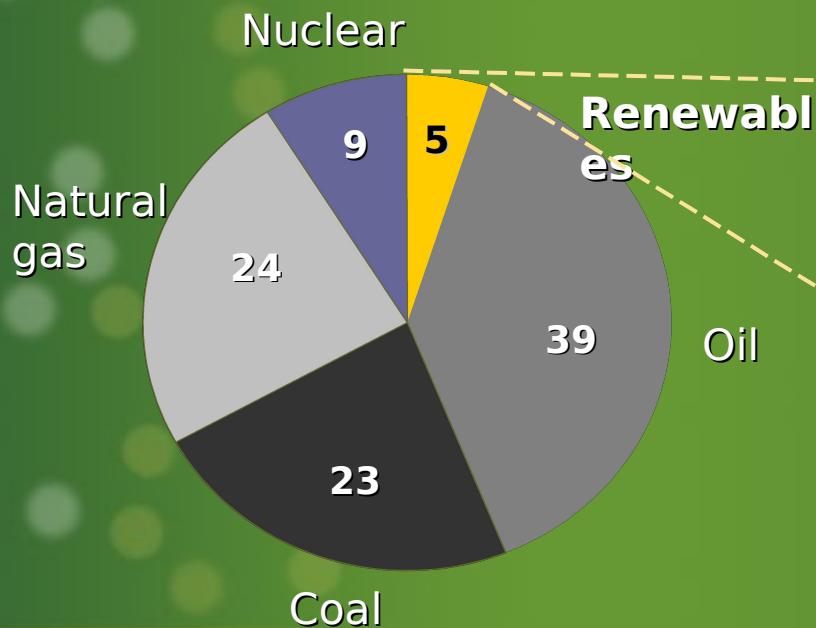
Source: International Energy Agency, *Renewables in Global Energy Supply: An IEA Fact Sheet* (2002)



U.S. primary energy supply - 2000

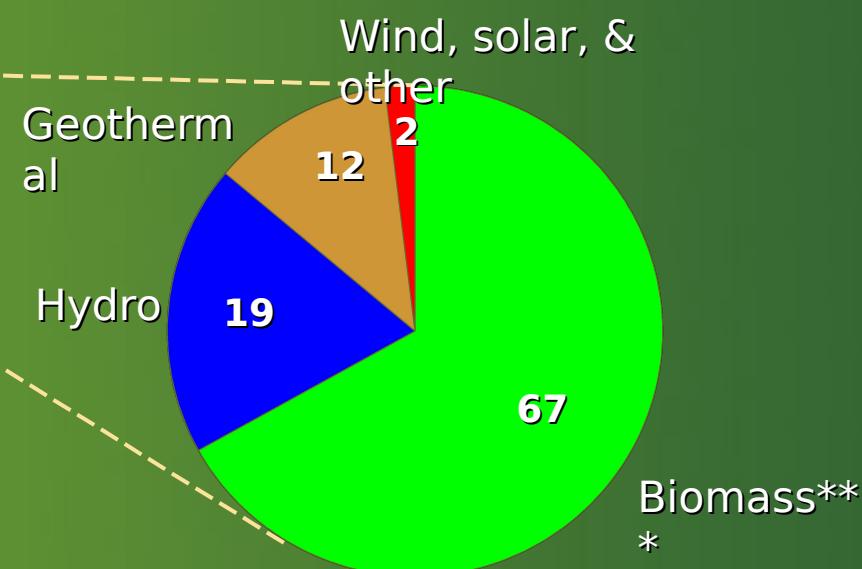
U.S. primary energy* supply,
2000

Percent, 100% = 2,300 Mtoe**



Breakdown by renewable resource, 2000

Percent, 100% = 110 Mtoe**



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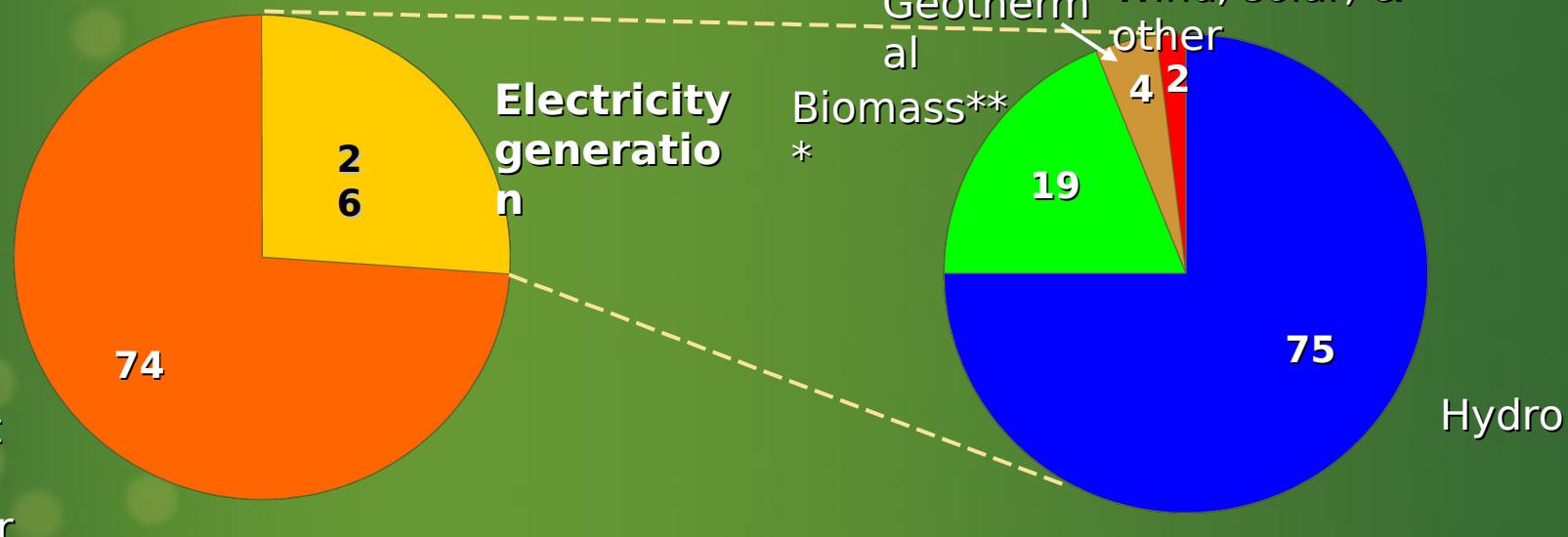
Source: International Energy Agency, *Energy Balances of OECD Countries 1999 - 2000* (2002)



U.S. primary renewable energy supply: Fuels for electricity generation - 2000

U.S. primary renewable energy supply, 2000

Percent, 100% = 110 Mtoe**



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**** Gigawatt-hours. One gigawatt-hour = 1,000,000 kilowatt-hours

Source: International Energy Agency, *Energy Balances of OECD Countries 1999 - 2000* (2002)



Wind has been the fastest growing renewable power resource since 2000

Installed nameplate capacity (MW)

Resource	YE 2000	YE 2003	CAGR ('00-'03)
Wind	2,578	6,372	35%
Solar PV	139	278	26%
Biomass*	7,434	7,478	0%
Geothermal	2,793	2,252	-7%
LFG-to-electricity	797	1,050	10%
Total	13,741	17,430	8.2%

* Net summer peak capacity

Source: American Wind Energy Association, Energy Information Administration, International Energy Agency, Landfill Methane Outreach Program



The Green Power Market Development Group

Developing corporate markets for 1,000 MW of new, cost-competitive green power by 2010 in the US



Alcoa Inc.

Cargill Dow LLC

Delphi

The Dow Chemical Corporation
DuPont

General Motors

IBM

Interface

Johnson & Johnson

Kinko's

Pitney Bowes Staples



The Group is pursuing several forms of green power . . .

Green electricity

- Wind
- Solar
- Biomass
- Landfill gas
- Geothermal
- Low-impact hydro



Green thermal energy

- Landfill gas
- Biomass
- Solar



“Clean” energy technologies

- Fuel cells



. . . that can be purchased in multiple ways

On-site systems

- Install renewable energy system on own premises



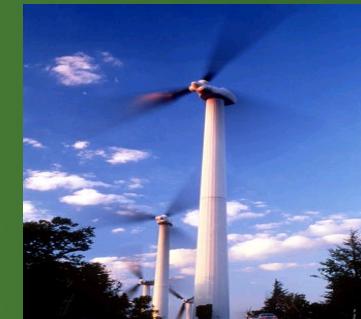
Green electricity

- Purchase renewable-generated power from retail electricity provider

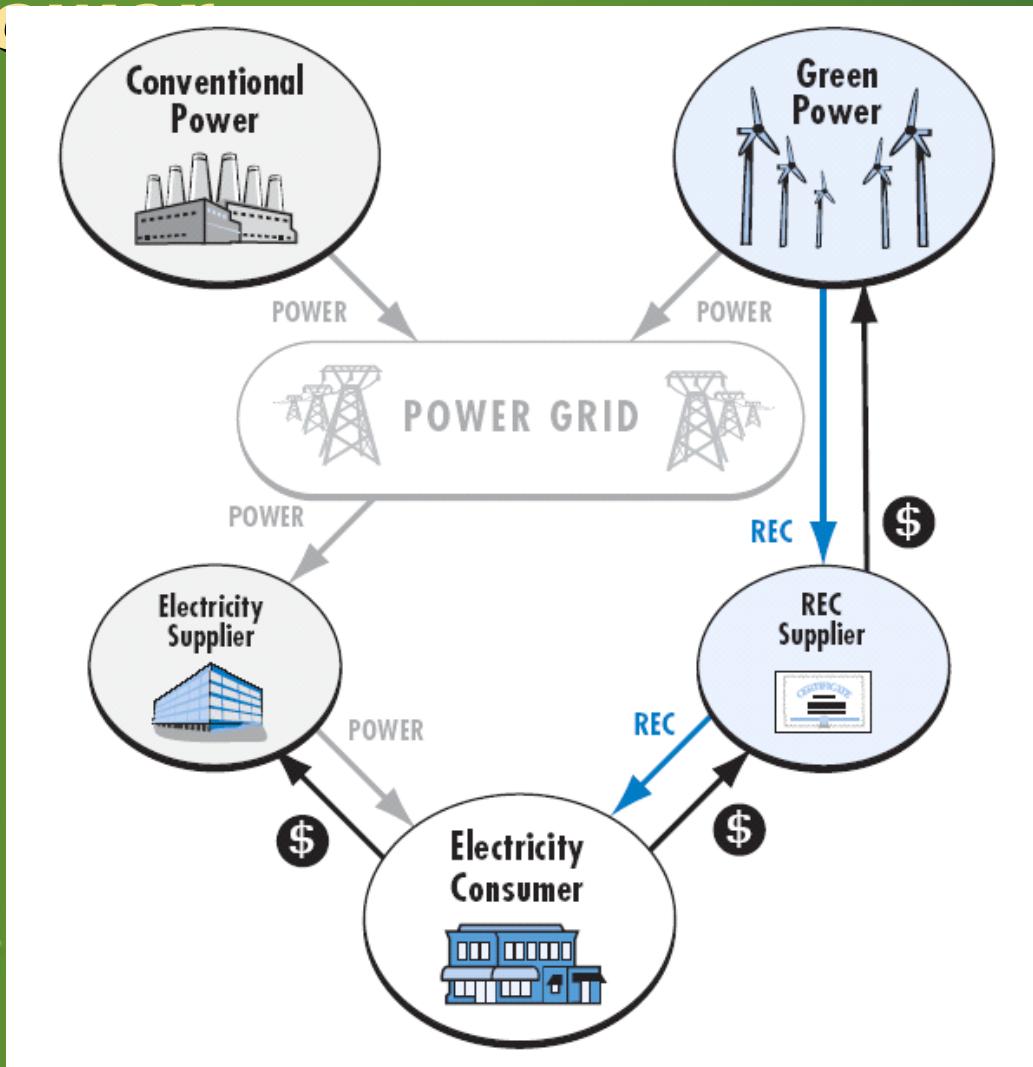


Renewable energy certificates

- Buy “environmental attributes” separately from commodity electricity



A renewable energy certificate (REC) represents the positive attributes of green power.



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Green power can provide several business benefits

- 1. Meet corporate targets and reduce emissions
(e.g. CO₂)**

- 2. Strengthen stakeholder relations**

Customers / branding

Employees and local communities

Shareholders

- 3. Improve costs**

Cost savings

"Peak-shaving"

Cost stabilization: Fossil fuel price hedge



Photo courtesy of Community Energy, Inc.



Switching from natural gas to landfill gas is saving GM \$500,000 per year at an assembly plant



- Fort Wayne, IN
- Truck Assembly Plant
- Landfill gas displaces natural gas
- Fixed price contract provides insulation against NG market price fluctuations

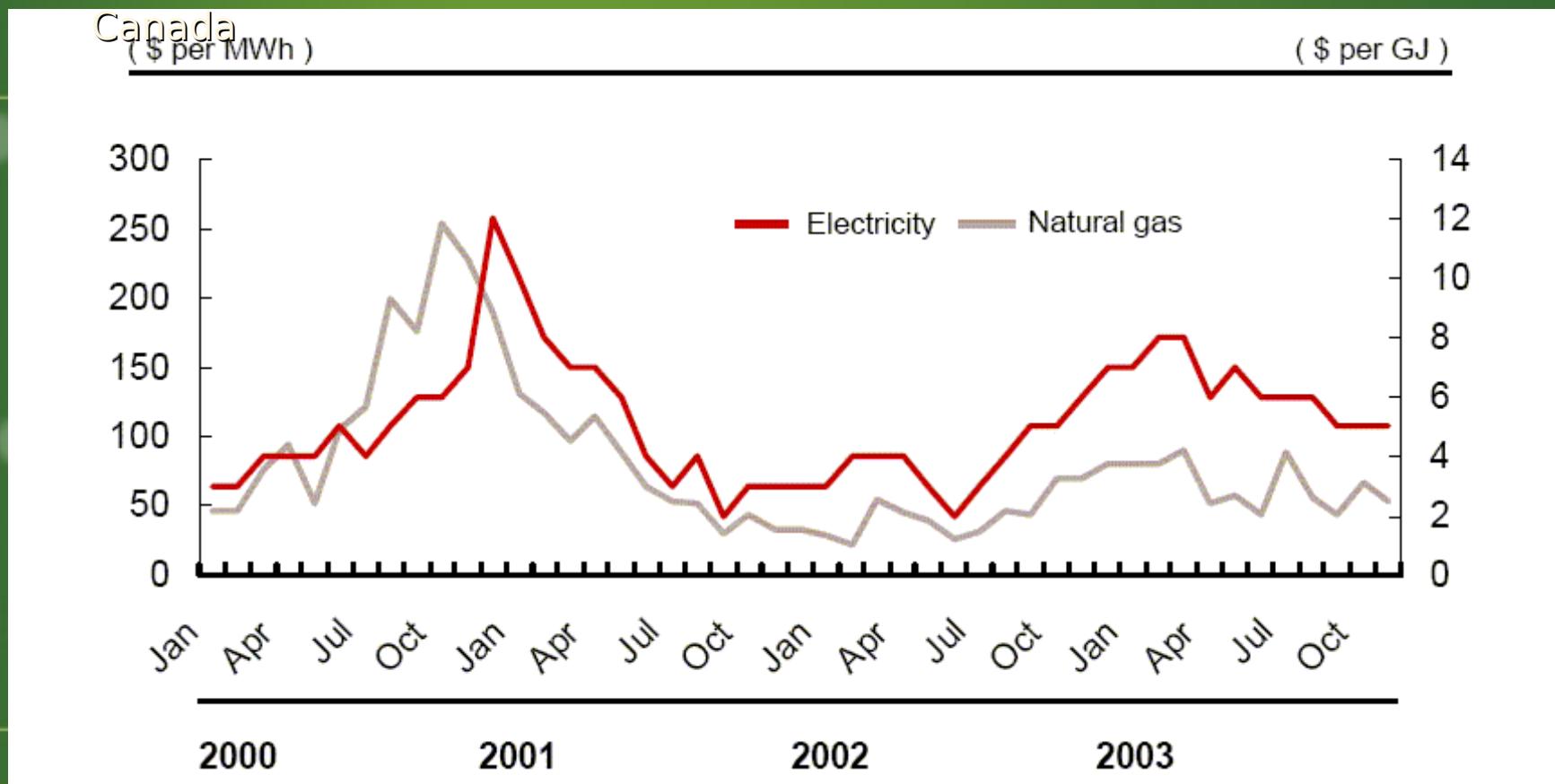


Photo courtesy of General Motors



Volatility in power prices can be driven by natural gas

Alberta,



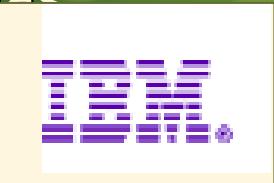
Source: Electric Power Pool of Alberta (electricity prices), Natural Gas Exchange Inc. AECO Next Day Price Index Value (natural gas prices)

Some green power products can serve as a hedge against fluctuating energy costs

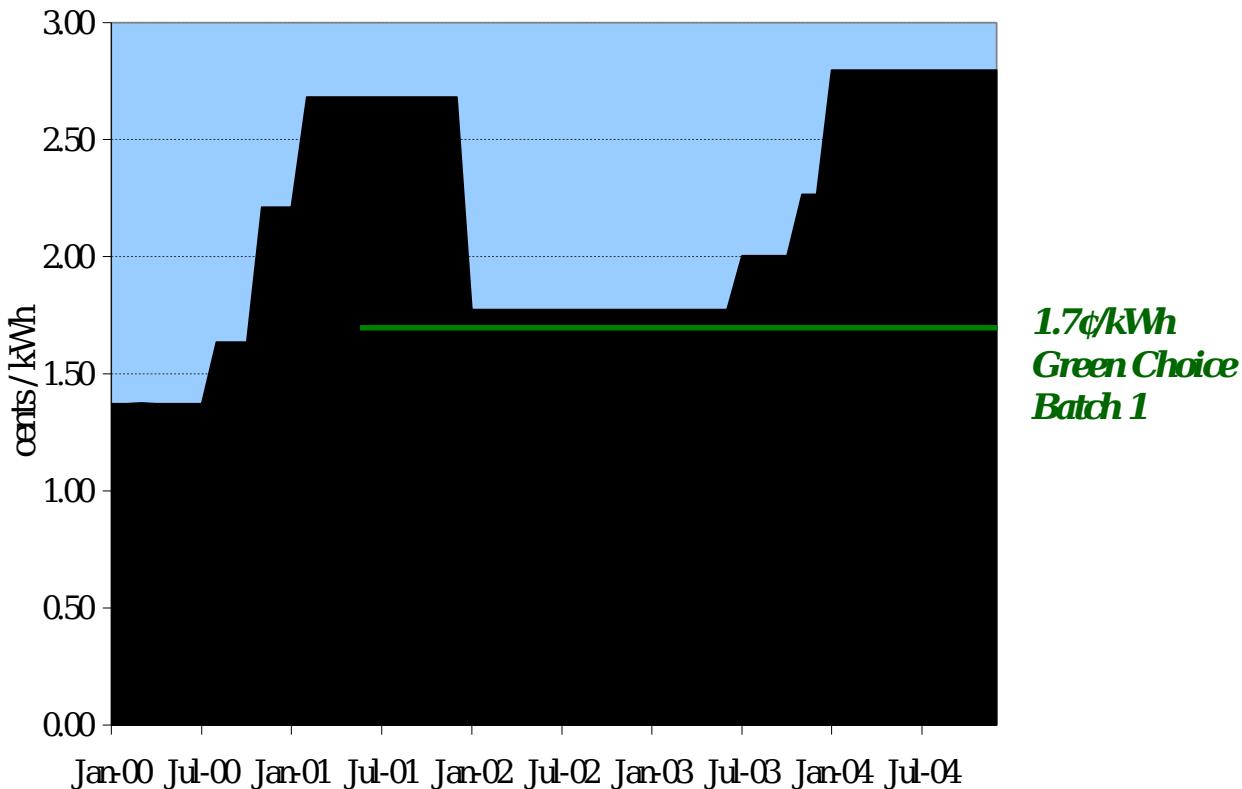
“GreenChoice”

Program

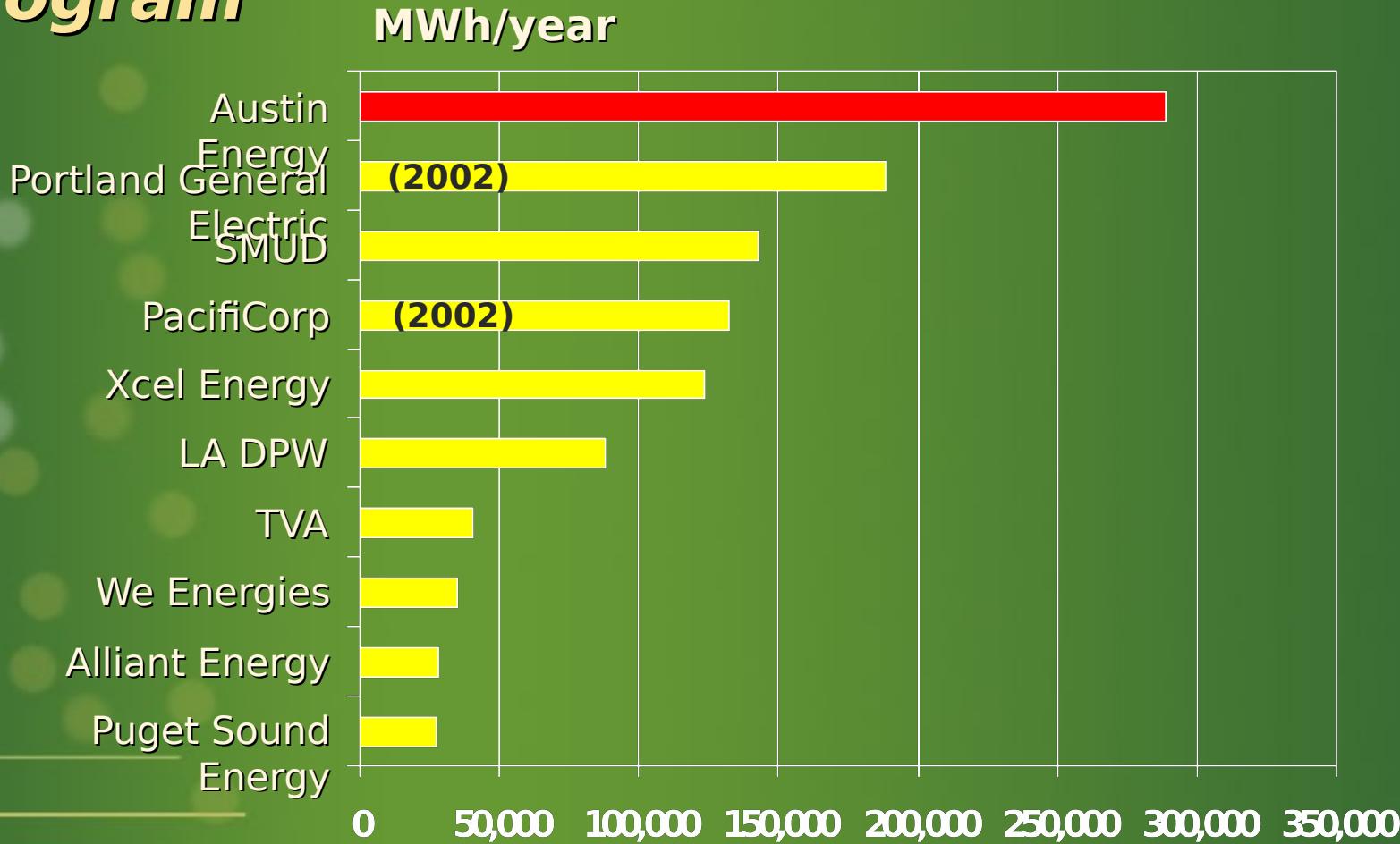
- Replace fluctuating fossil fuel charge with fixed renewable fuel charge
- Fixed until 2011
- Wind & landfill gas



Austin Energy Fuel Charge vs. Green Choice Charge



Selling the “hedge value” propelled Austin Energy’s green power program



Source: U.S. Department of Energy, National Renewable Energy Laboratory. As of December 2003.



Strategies used for buying green power

Leverage government incentives

- Rebates, accelerated depreciation, etc. for on-site systems

Squeeze costs

- Competitively bid
- Aggregate demand when soliciting proposals (within, with others)
- Work with supplier to design new green power product

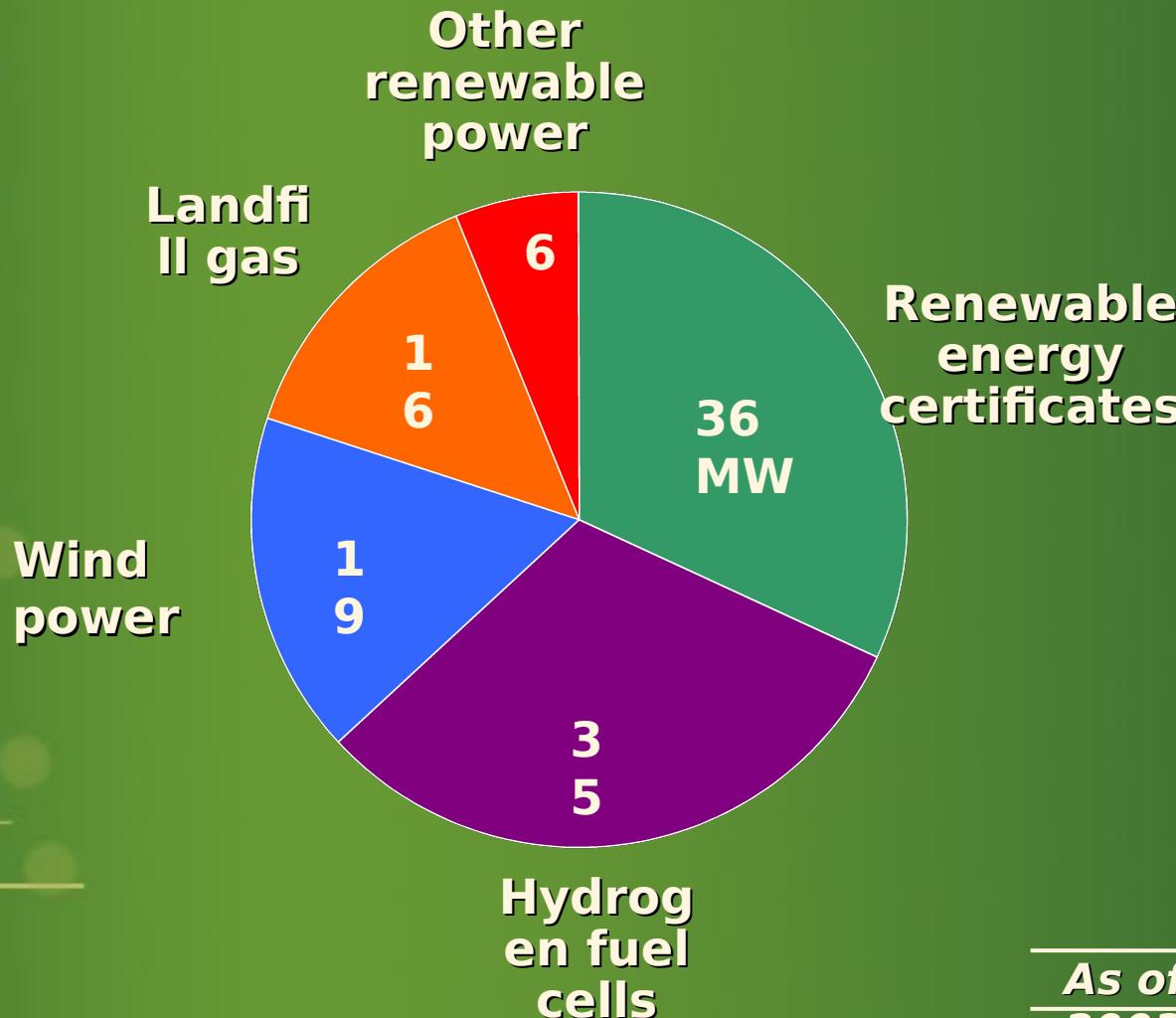


Find creative ways to pay for premium (if any) by energy efficiency

- Use savings achieved by switching to new electricity supplier
- Realize hedge value of green power



The Group has completed 112 MW of green power projects and purchases



*As of December
2003*



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RECs markets are growing due to several advantages



Photo courtesy of National Renewable Energy Laboratory

- Lower cost
- Wider selection of suppliers
- Greater variety of renewable resource options
- Simplified transactions
 - Independent of electricity supply
 - Multiple locations at once



By aggregating demand, 9 Group partners & WRI completed the largest corporate RECs purchase

Over 265,000 MWh per year



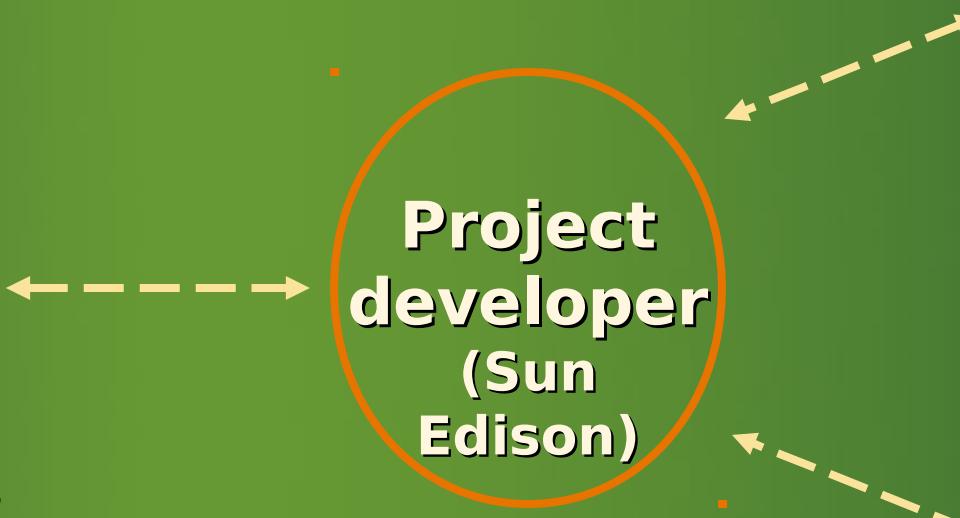
ALCOA

**DELPHI***Johnson & Johnson***STAPLES**that was easy.sm**SEPTEMBER
2003**

The “services model” using solar power



- Receives solar power from on-site system under long-term contract
- Provides space & access but does not own array
- No capital required



- Receives income from electricity sales
- Arranges financing, design & construction



- Receives revenue from equipment sales
- Provides warranties



- Receives low-risk ROI from power sales & from government incentives
- Provides capital & owns system



Building markets for stationary fuel cells



Photo courtesy of The Dow Chemical Company



- **Use for by-product hydrogen**
- **Reduced emissions**
- **Cost-competitive electricity**
- **Improved fuel cell design and increased fuel cell production scale**



By developing new products, the Group is making green power more attractive to C&I customers

Case example: Pepco Energy Services & Tower Cos., March 2003

Off-the-shelf
green power

New green
power product

Local LFG REC
+
Local electricity

High premium

National biomass REC
+
Local electricity

Lower premium

More options



For More Information...

www.thegreenpowergroup.org

